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Users' needs and business models for a sustainable mobility information network in the Alpine Space

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Abstract

The paper investigates what are the possible business models allowing to maintain a "Sustainable Mobility Information Network for the Alpine Space". The starting point was the lack of an integrative door-to-door information system in the Alpine regions and the project aimed at providing travellers with comprehensive information about sustainable transport modes beyond regional and national borders. To this end a survey has been designed using a quali-quantitative method (web-questionnaire and focus groups) to investigate the needs of the tourist and transport operators. The sample included all the main actors in the transport and tourism field active in the territory of the five pilot regions: Piemonte (Italy), Rhone Alpes-Paca (France), Lake Constance and Lake Chiemsee (Germany), Gorizia (Italy) and Nova Gorica (Slovenia).
The research has showed that there is not a single solution to define a unique business model for the tools developed by AlpInfoNet and has, likewise, developed specific actions and approaches according to the target users.

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Keywords: Advanced Travellers Information Systems; sustainable mobility, Alpin Space.

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1. Introduction

Transport is responsible for around a quarter of EU greenhouse gases emissions, making it the second biggest greenhouse gases emitting sector after energy (Hill et al., 2012). Furthermore, the rise of people mobility, capital availability and low cost vehicles favour an increase of trips by private car (The New Climate Economy, 2014) with a related emission growth.

How to reach the target of low transport emissions is an issue spanning many aspects; it cannot be dealt with only adopting technological solutions for the vehicles (Anable and Boardman, 2005), but it requires to pay attention to behavioural issues (Chapman, 2007). This last aspect is very crucial because it implies the change of personal rules of individuals, depending on many factors like personal attitudes, transport supply availability, mobility purpose and social change (Button and Nijkamp, 1997). While these factors have been mainly studied for work travel and mobility of commuters, they have been understudied for leisure-related travels (Holden, 2007), even if they represent an important segment of mobility demand. The World Tourism Organization (UNWTO) shows that, in the 2013, 1087 million of international tourists have been recorded and they expect an increase by 3.3% per year from 2010 to 2030, reaching 1.8 billion by 2030 (UNWTO, 2014). It is clear that, while more attention is paid to the overall emission reduction, there is an important increase of emissions caused by tourism (Tight et al., 2005, Anderson et al., 2006; Pang et al., 2012). This phenomenon could be related to different industrial development of countries where tourism is considered an important source of revenue (Dubois et al., 2011); in fact, more and more cities base their economy on tourism, so the matter of sustainable tourism is becoming increasingly important from different points of view (EU Commision, 2010).

The relationship between tourism and transport is addressed in some studies (Peeters and Landré, 2012; Scutarri et al., 2013; Duval, 2013) and, notably in rural areas, tourism is perceived as a main cause of mobility problems (Hall, 1999; Dickinson et al., 2009) with important effects on health (WHO, 2000). In some cases, it was showed that 40-50% of environmental loads related to tourism are caused by transport of tourists from their home to the destination (Lange, 1995).

Sustainability ranks high among key issues in transport, more so in a sensitive environment as the Alpine Space, where tourist mobility is an important market asset. The Convention on the Protection of the Alps (Alpine Convention) is a binding international agreement between the Alpine countries and the EU whereby the contracting parties commit to adopting measures to protect the Alps and make environmentally compatible use of resources. Instrument like Alpine Space Programme (http://www.alpine-space.eu/) and European Grouping of Territorial Cooperation-EGTC promote the transnational cooperation involving local, regional and national stakeholders (Ruffini et al., 2010).

Alpine regions need to capture the growing tourist demand and to stimulate a more sustainable mobility, adopting specific tools and solutions. Thus, integrated information systems become crucial in the sector, both locally and across national borders, enabling tourists to plan their travels using transport modes alternative to the private car, with special emphasis to the “last mile”.

The attainment of the stated goals demands the participation of different actors involved in the tourism industry: hotels, public transport companies, cities and regions (Hoyer, 2010). Those actors are using more and more the new technologies – together with new tourism organisational process, like hotel chains – to contribute to the improvement of services’ and reduction of travel costs (Hall and Williams, 2008, Shanker, 2008) and they are adding to the pre-trip information (most used for business travels) those related to the characteristics of individuals rather than to the trip itself (Farag and Lyons, 2012).

The Flash Eurobarometer (EU Commission, 2015) shows how internet is the most used instrument for organising the holidays. The use of social networks and the diffusion of applications based on Global Positioning System (GPS) offer new tools, like navigators, to enrich tourism experience and activities (Hannan et al., 2014), promoting dissemination of information (Litvin et al., 2008) and influencing tourism mobility at destination (Tussyadiah, 2012; Brown et al., 2013). This information could influence and prompt people to divert towards more sustainable modes of transport, changing their mobility patterns (Chorus et al., 2006). An estimation of potential global value of smart routing, in the form of time and fuel saving, will be about 500 billion dollars by 2020; this amount is equivalent to save 10-15 hours every year for each traveller with a positive effect on pollutant emissions (Manyika et al., 2011).

The evolution in the Information and Communication Technology (ICT) market has increased the use of mobile applications, travel assistants, trip planners – usually related to a single city (Wang and Xiang, 2012) – and that could boost the added value if implemented in wider areas. However, the application of this kind of tools on transnational areas makes the solution more complex. The required data to make the tools ready to market are heterogeneous due to the fact that they come from different bodies (public, private), who collect information for different purposes.

The difference in standards, data typologies and data management is only a part of the technological difficulties that, together with national legislations and privacy issues, could generate barriers to the adoption of the ICT tools and to their upholding over the years.

For a realistic tools' development an analysis of the business model is essential to define key factors including: "*i) a customer value proposition that meets customer needs better than current alternatives; ii) a profit formula that lays out how to make money delivering the value proposition; iii) the identification of key resources that the value proposition requires; and iv) the implementation of the key processes needed to deliver it*" (OECD, 2013).

In the case of Alpine Space, the "key processes" are important mainly to evaluate possible agreements among partners for data sharing and to define how to get the capital for the economical sustainability of the tools. While in literature there are some examples referring to public-private partnerships on advanced traveller information systems for traffic (Choi et al., 2001; Wendell, 2007), few examples are related to tourism sector.

The increasing of value creation, also referred to the external benefits, due to the development and diffusion of Intelligent Transport Systems (ITS), can be seen as a summary of interactions and value creation among the main actors involved in the process (Giannoutakis and Li, 2011). In Fig. 1, the different layers account for different levels of the society, from the ITS providers, whose value is produced through the creation of intelligent vehicles and infrastructures, to the highest level of the entire society, where the external benefits are valued in the economy.

Moreover, the increase in big data availability related to the proliferation of location-based services (LBS) shows new market opportunities (Manyika et al., 2011; Muhtaroglu et al., 2013).

The questions to be asked is how to capture value from delivering information and how users can get information without bearing upon the public sector. The answer passes through the definition of the business model.

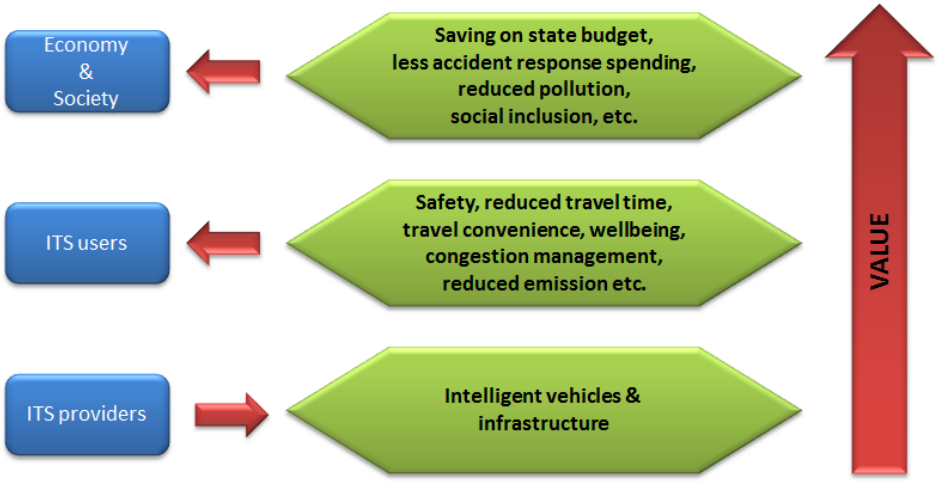

Fig. 1. Value and interaction of different "layers" in a ITS process (adapted from Giannoutakis and Li, 2011)

This paper investigates what are the possible business models allowing to retain a "Sustainable Mobility Information Network" (SMIN) for the Alpine Space. The rationale was the lack of an integrative door-to-door information system in the Alpine regions and the AlpInfoNet project aimed at providing travellers with comprehensive information about sustainable transport modes beyond regional and national borders. AlpInfoNet covers different Alpine space regions: Piemonte (Italy), Rhone Alpes-Paca (France), Lake Constance and Lake

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Chiemsee (Germany-Austria), Gorizia (Italy) and Nova Gorica (Slovenia). Thus, such a project may benefit from the peculiar nature of the offered service as described by Bucherer and Uckelmann (2011): information is infinitely shareable, allows large economies of scale, its value increases with use, but depreciates over time, and, finally, its value also raises when combined with other (relevant and associated) information.

The next section presents some business models found in literature that can be reference points for the development of one to be adaptable to AlpInfoNet. Section 3 describes the methodology for individuating the possible business models through the surveys administered to the stakeholders in the five pilot regions. The results are presented in section 4 and allow to put forward a solution for a perennial business model useful to uphold the services created by the project over the years. Finally, section 5 discusses those results and compares them with the relevant literature.

2. Some business models in literature

In the era of internet, a lot of new products are put on the market. The diffusion of the web and the accessibility of internet from different devices (PCs, smartphones, tablets, etc.) promote the dematerialisation of the products, notably for software and applications. People do not need the physical support for the software because they can download it anytime and anywhere. The immediate availability of the service/tools and new methods allowing the customers to evaluate the products (for example trial periods) favour their use and increase customers' loyalty to them.

Many services providing information have adopted the so-called "freemium" model (Anderson, 1987): it delivers a free limited service to users with basic needs, in order to build a reputation, also thanks to the word of mouth; then, a premium service is provided for getting additional features or complementary software and services, that some users are willing to pay because they have gained confidence on the provider.

Following this "freemium model", it is possible to find mixed models: free services/applications supported by advertising revenue, sponsor links for mobile location-enabled search (nearby point of interest, POI), advertising embedded in mobile application. In other cases the application could require premiums for download or subscription: one time charge at download, subscription fees, add-on charge, for example purchase of virtual items in mobile games (Manyika et al., 2011).

The services like trip planners, transport navigators, etc., can also be considered as a public good, paid for with public money, and they are expected to have a positive effect in the long term. Most publications referring to the evaluation of Advanced Traveller Information Systems (ATISs) are dealing with cost-benefit or multi-criteria analysis to assess the long-term benefit of ATISs' adoption by travellers (mainly assessed through the reduction of CO_2 emissions and of travel time) and do not consider a stand-alone perennial business model (Giannatoukis and Li, 2011).

Within the EU vision, the internet-based travel information systems are free for the users and the costs of maintenance and of infrastructure are shared among transport providers that are part of the network[†]. Transport companies benefit from cross-border information service to develop their market share.

The Caravel project points out that achieving economic sustainability for an info-mobility platform is a barrier to the tool deployment (EU CIVITAS-Caravel, 2009), considering the users low willingness to pay, and strongly suggests to find some other sources of revenue such as advertising or data mining; for example, extracting very detailed information gathered from users to deploy marketing services.

The SUPERHUB Project (SUPERHUB, 2013) defined precise market segments, without a final implementation of the service yet, and proposed different business model scenarios, including: a) transaction fees from booking through the platform; b) interest income from floating e-wallets and advertising, plus a premium service for customers with high purchasing power; c) willingness to pay for fast, secure and convenient transport (high quality

[†] http://eu-spirit.eu/provided/financing/ (accessed on July 2014)

tailored service). The platform may act as a medium from which the customer may book transport tickets, hotel rooms or other kind of services. This typology of incorporated services requires that the contractual relationships shall be managed by service providers, who may take benefits from the tool as they can reach specific customer segments thanks to the system. The project also encompasses the possibility for the service owner to provide consultancy to the clients or to the transport provider.

The city of Genova (Italy) offers a premium service for users and companies[‡] to get information through different devices sending alerts about the traffic conditions (works, alternative routes, etc.). They also launched SMS-ticketing that allows to reduce costs by dematerializing tickets.

In the road traffic sector, different examples are investigated presenting solutions of ATISs including a complete public, complete private and private-public partnership (Choi et al., 2001). The first one appears less attractive to entrepreneurs than the other two; private firms are more comfortable in a competitive market than in competing with public sector and there may be a mistrust of publicly collected data as compared to privately collected data (Choi et al., 2001). In other studies, four business models are identified (TRAC, 1998): the public centered, the contracted, the franchise and the private competitive operation models. Those four business models differ with respect to the typologies of control information, responsibilities for the functions of data collection, fusion and dissemination (Wendell, 2007). Furthering those models, McQueen et al. (2002) defined eight additional theoretical models suggesting a sharing with private sector of one or more ATIS functions.

The InfoTrip Company, with the service myroute[§], developed – thanks to Viajeo Project – a free web-based route planner and a pay-per-use service to receive directions on mobile devices.

However, these last examples seem to have failed to be spread among the travellers and there is not a clear evidence in literature about the reason of such failure; however, some points are worthy of consideration: closed or inaccessible websites, most recent news from more than 18 months ago, bad reviews on online applications shops or bankrupted companies seems to be the norm amongst info-mobility projects once the funds for the research and development are over.

Indeed, the costs of such applications include the acquisition and maintenance of data and only a wide use and a high acceptance by the end users will make the effort worthwhile. This idea is somewhat supported by Van den Bergh et al. (2007), who studied many examples in sustainable transport initiatives and identified the key factors of success and failure, highlighting the dominant effect of political, administrative and socio-cultural factors over the technical and economical aspect of a project.

3. Methodology: the surveys and the business model canvas

To define possible business models related to a Sustainable Mobility Information Network for the Alpine Space and suitable to the regions involved in the AlpInfoNet project, the fundamental aspect was the understanding of the users' needs that is, in our case, the stakeholders' needs involved in the tourism market.

To this end a three-step methodology was defined, providing:

- a first survey, administered at the beginning of the project, to the transport and tourism operators offering their services in the five pilot regions, aimed at collecting both the general information on those services and several aspects of the local, regional and national information systems related to sustainable mobility and tourism, together with their operational, organizational and technical restrictions. More precisely, the questions referred to the typology of data shared by the transport and tourism operators with the users and to the technical and policy restriction for data sharing. Then, the operators requirements were investigated as regards both their

[‡] www.mobilitypoint.it (accessed on July 2014)
[§] www.myroute.gr (accessed on July 2014)
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willingness to pay for AlpInfoNet tools/services and their intentions to create a new information platform or improve and connect already existing information systems for transport and tourism;
- the definition of the "business model canvas" (Osterwalder and Pigneur, 2010) suitable to the AlpInfoNet stakeholders allowing to identify the actions and the actors to involve in the application development and maintenance. This step allows for calibrating the business model;
- a second survey designed on the basis of the canvas and administered, at the end of the project, to the regional administrations involved to collect the information needed to fill in the canvas and propose the business model.

The surveys have been designed using a quali-quantitative method to investigate the needs of the tourist and transport operators as well as of regional administrations. This mixed approach included web-questionnaire, focus groups and interviews to collect in a comprehensive and detailed way all the information needed to design the potential business model. Furthermore, such an approach allowed to go in depth in each specific situation to understand the similarities/diversities among the stakeholders and the way in which each operator worked and, thus, if a common model was possible or customized models were necessary.

The sample of the first survey included all the main actors in the transport and tourism field working in the territory of four[**] pilot regions, notably the national and/or regional transport information services provider, administrations, tourism and passenger associations:
- 20 stakeholders from lake Costance region (DE);
- 30 stakeholders from lake Chiemsee region (DE-AT), 27 from the German side and 3 from the Austrian side;
- 24 stakeholders from Piemonte region (I);
- 15 stakeholders from Rhone Alpes-Paca regions (F).

This first step allowed to understand what data and information systems were available in the involved regions to define the tools/services to be developed for providing travellers with comprehensive information about sustainable transport modes, beyond regional and national borders, and to convey to them information through smart channels. To this end, a strategy for the dissemination of public transport information, integrating existing information systems into a sustainable mobility information network (AlpInfoNet) was conceived. After that, a business model canvas (Osterwalder and Pigneur, 2010) has been used giving the possibility to summarise services/products, highlighting all different aspects.

This model describes and shows, in nine blocks, the logic of the AlpInfoNet services and activities.

The blocks cover the four main areas of a business: customers; supply; infrastructure; financial viability.

The nine blocks are represented by:
1. customers' segment: it represents the market to be addressed by AlpInfoNet in terms of different people needs, distribution channels, relationships, willingness to pay, etc.;
2. value propositions: they collect the reasons supporting the choice of AlpInfoNet services that are useful to the customers; for example, a new added value, the services helping to solve customers' problems, the AlpInfoNet services satisfying customers' needs;
3. channels: they describe how AlpInfoNet is reached by the customers and how visible it is by the users;
4. customer relationships: they describe the types of relationships AlpInfoNet establishes with customers' segments: personal assistance, dedicated personal assistance, self-services, automated services, communities;
5. revenue streams: they come from the willingness to pay of the customers' segment: usage fee, subscription fees, lending, renting, leasing, licensing;
6. key resources: they describe the most important assets required to make a business model working. The resources could be physical, intellectual, human, financial;
7. key activities: they collect the most important actions to carry out to make AlpInfoNet business model working;
8. key partnerships: they describe the network of suppliers and partners that make the business model working: strategic alliances between non-competitors, competition, joint venture, buyer-supplier relationships;

[**] The region Gorizia-Nova Goriska did not participated to this first survey being entered later in the project.

9. cost structure: it describes the AlpInfoNet costs needed to operate the business model.

The canvas model allowed to design a second survey, according to the scheme presented in table 1, trying to fill up some of the nine blocks above and, likewise, to develop possible/s business model/s suitable to AlpInfoNet partners. To get a realistic business model, the sample of this second survey was made up by the regional administrations involved in the project: Piemonte (Italy), Rhone Alpes-Paca (France), Lake Constance and Lake Chiemsee (Germany), Gorizia (Italy) and Nova Gorica (Slovenia). The decision to carry out a second survey at the end of the project has been a crucial one. In fact, even though the AlpInfoNet products have been defined at the beginning, only at the final stage had the partners a realistic vision about the implementation of the tools/services so far developed and about potential redress due to some technical or juridical constraints occurred during the project.

Table 1. Questionnaire framework of the second survey administered to the regional administrations

COST OF ALPINFONET
Who will host the server with the AlpInfoNet application?
Do you have and estimation of the cost for hosting the application?
Who will be responsible for the management and the technical assistance of AlpInfoNet application?
Who will be responsible for the upgrade of the AlpInfoNet application?
Do you have an estimation of the cost for AlpInfoNet assistance?
PAYMENT OF ALPINFONET
Is your AlpInfoNet application supplied free of charge ?
If YES, how do you plan to finance the AlpInfoNet application?
If NO, how much does it cost ?
In which way will you offer the application to the users? (Annual/monthly/daily subscription, etc.)
MANAGEMENT OF ALPINFONET
Are you going to keep AlpInfoNet application like a public service or do you need a private collaboration?
If you require a private collaboration, please specify the modality
GENERAL INFORMATION
Do you have, in your country, examples of funding of similar services?
Do you have some experience as a SaaS (Software as a service) provider ?
Are there some other applications running under your control ?

4. Results

Several solutions – smartphone applications, widgets, web portals, route planners and navigators – have been developed, tailored to each pilot region, implying cooperation among multiple public and private actors (decision makers, transport and tourism companies, POIs, hotels) and demanding a willingness from involved stakeholders to share the data required by the tools/services. Even though each region has some specific conditions concerning the information systems, there are few differences among them as regards the tools/service they decided to adopt. A database for the integration of all the geo-localised POIs has been created and specific rules to associate POIs with existing databases of public transport services have been defined. Furthermore, a widget has been created to link information on POIs and transport services usable to furnish information on how to get to a place in a sustainable way.

In table 2 the tools/services developed during the project in the five pilot regions are presented. The information from Gorizia and Nova Goriska regions come from a specific survey as they did not participate in the first one due to their belated active involvement in the project.

As the results show, the regions involved in the project decided not to create a new information platform, considering the existence and the relevance of the local, regional, and national information systems related to sustainable mobility and tourism and to their operational, organisational and technical restrictions. The preferred strategy has been to improve and connect already existing information systems in transport and tourism, in order to facilitate the accessibility of the Alpine Space and the local mobility for the travellers. This approach allows a reduction in development and maintenance costs thanks to a simple and automatic procedure.

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Table 2. Tools and services developed in the regions involved in the AlpInfoNet project

Pilot region	Developed tools/services
Piemonte region Italy	A transport-tourism cross border Italy-France Map will be developed by the French partners and integrated in the Italian Institutional regional tourism web site.
Provence Alpes Côte d'Azur-Rhône Alpes France	In the trans-boundary French-Italian pilot region, the AlpInfoNet application includes two main categories of products: • a SMI kit, where a web platform aggregates information and provides web-services to third parties; • a demonstrator of trans boundary (France-Italy) journey planning service, made of interfaces (with existing MIS and to third parties), a meta server and an end-user web portal. These two products will be developed by IT companies which will host the applications on their own dedicated servers until June 2016. Moreover these products rely on other information systems provided by the public authorities of the pilot region. Up to 30/06/2016 (end of the public contract), the PACA Region is the official and legal owner of the AlpInfoNet application in the trans-boundary French-Italian pilot region.
Lake Costance Germany	There is not a specific application offered within AlpInfoNet. A "start widget" has been developed; it is a website template adapted to different pilot regions. It can be downloaded by tourism service provider and installed on their websites. A central server is not needed for this functionality. The only centralised function is needed for a regular updating and maintenance of the data on local mobility. The website template is offered as a single action and will be offered on the AlpInfoNet project website and will be probably offered as well on the website of the Bavarian tourism marketing association and the State ministry for internal affairs.
Lake Costance Austria	Instead of using a new AlpInfoNet application and an own server, an optimised connection of the already existing systems of Mobility Information Systems (across VAO) and Tourism Information Systems (across GeoWeb) is being established. The services will be offered on the website of the State of Vorarlberg, VVV and VT (where it is permanently available).
Lake Chiemsee Germany	There is not a specific application offered within AlpInfoNet. A "start widget" has been developed; it is a website template adapted to the different pilot regions. It can be downloaded by tourism service provider and installed on their websites. A central server is not needed for this functionality. The only centralised function is needed for a regular updating and maintenance of the data on local mobility. The solution adopted will be available for download.
Province of Gorizia and Goriška Italy, Slovenia	The developed widget will be available on the official AlpInfoNet web site. The information about the widget could be available on the web sites of regional/local touristic information centres, municipalities, etc. The touristic operator (e.g. a hotel) should download the widget by and insert it on its website; technical assistance should be provided by external company if needed.

The multiplicity of the tools/services adopted by the pilot regions implies that it is not possible to define a unique business model for the developed tools due to lack of homogeneity among users involved in the AlpInfoNet project, as observed in Fig. 2. Users like public and private transport operators, regional and local authorities and tourism operators have different needs and management approaches. For example, the tourism actors are ready to promote Sustainable Mobility Information (SMI) services if they clearly identify their interest and the way to exploit the added value for their business. In addition, they think that the promotion of Sustainable Transport Mobility (STM) mainly favours the transport operators, as they will attract more customers. However, they are aware that travellers' habits are changing and that promoting STM could be valuable in the medium term. On the other hand, the transport operators state that the sustainable development is a perspective to be endorsed mainly by public authorities, although they could benefit from technical exchanges about this concept. Such view is close to what found in literature about other projects (Choi et al., 2001; TRAC, 1998). However if a viable business model is sought, commercial actors should somehow have a role to play, in order to promote the developed tools/services and to participate in the co-financing of the network; but, to this extent, they should find an added value to their own business.

Under a technical point of view, the actors involved in the AlpInfoNet project are ready to share data and information and to collaborate if such collaboration allows them to increase the number of their costumers or if the tools provide an added value to their service. However, their willingness to pay is very low and depends on their business return.

A main constraint for the public transport operators regards the need to create data compatible with the application because the standardisation of data is expensive. Thus, to be sure that the public transport operators are willing to use the AlpInfoNet tools/services, such services have to ask for very few standard data or little manipulation of data from the transport company.

Fig. 2. AlpInfoNet potential users

4.1. AlpInfoNet business model canvas

The AlpInfoNet business model canvas has been developed according to the nine blocks presented in section 3; it is like a Multi-Sided Platform: "*an organization that creates value primarily by enabling direct interactions between two (or more) distinct types of affiliated customers*" (Hagiu and Wright, 2011). In the proposed solution, tourists could contact transport and tourism operators through the AlpInfoNet tools/services to obtain information on how to reach touristic places in the Alpine area by public transport (or in general less pollutant modes). This activity asks for the collaboration of the actors working in the countries involved in the project. Thence, due to co-marketing and collaborative innovation, it is also possible to find a kind of competition-based business model (Bengtsson and Kock, 2000; Brandenburger and Nalebuff, 1996).

The nine blocks presented in section 3 are discussed below and showed in table 3 where the order of presentation of the different issues does not follow the order from 1 to 9, but the sequence of questions to be answered establishing the business model.

1. Customers' segment: the customers involved in the AlpInfoNet project are numerous and diverse, spanning from individuals to public administrations, associations and tourism and transport operators. This kind of tool/service, as a smart routing application, could target mass markets, especially in the segment of GPS enabled devices (Muhtaroglu et al., 2013).
2. Value propositions: different customers request diverse added values of AlpInfoNet tools/services to be addressed. Some values can be the same for different customers (for example the increase of number of customers) and could have an effect in the short period. In other cases they refer to long time effects, for example the modal diversion (from private to public/collective mode of transport) and the reduction of pollution due to tourism travels, frequent requests coming from stakeholders.

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3. Table 3 AlpInfoNet business model canvas

<table>
<tr>
<td rowspan="2">8. Key Partners
• Tourism operators
• Tourism associations
• Municipalities
• Regions
• Public transport operators
• Private transport operators
• Hotels, camping, museums, etc., all points of interest (POIs)</td>
<td>7. Key Activities
• Collecting the data and building the database
• Updating the database in terms of new POIs/services
• Updating the database in terms of the most recent information
• POIs and Services: giving the data in the right format for the services
• Maintenance of the server where the tools are located</td>
<td rowspan="2">2. Value Proposition
• Increase the visibility of products and services
• Increase the number of customers
• Increase the attractiveness of tourism places and services through the use of smart tools like web portals and mobile apps
• Increase the accessibility of POIs/places
• Make available the tourism services in the internet and in the mobile services at no cost.
• Increase and promote the sustainable mobility for tourism
• Make the public/collective transport services attractive also for tourism purposes
• Provide a decision support tool for finding solutions as alternative route planning and trip cost evaluation, both for tourism and non-tourism purposes
• Put forward a specific solution for people who do not like using the private car or, in general, non-sustainable modes and who want to maintain their habits also for tourism purposes</td>
<td>4. Customer Relationships
• Self-service: tourists and people use the application by themselves on mobile or internet
• Self-service: transport operators, tourism operators, hotels, etc., send in automatic way the information to the system and can take Alpinfonet widget on their web portal
• A contact person has to be appointed to be responsible in the case of problems or service disruption</td>
<td rowspan="2">1. Customer Segments
• National and international (transalpine) tourists
• Commuters (partly)
• People relying on internet and mobile applications

Some of the key partners could also be customers:
• Ho.Re.Ca.
• Municipalities
• Tourist information/associations
• Public and private transport operators</td>
</tr>
<tr>
<td>6. Key resources
• Servers where the tools/systems are hosted
• Technicians for system updating/maintenance</td>
<td>3. Channels
Internet:
• Tourist information web portals
• Regional web portals
• Public transport web portals
• Ho.Re.Ca. web portals
• POIs web portals

Mobile:
• Mobile applications related to the web site</td>
</tr>
<tr>
<td colspan="3">9. Cost Structure
• Maintenance of the server/system
• Activities for updating the system</td>
<td colspan="2">5. Revenue Streams
• Free use of the application (widgets) by tourists
• Free of charge access for Ho.Re.Ca. that would use the application</td>
</tr>
</table>

3. Channels: due to the typologies of the tools/services developed, the internet platform and mobile application are the platforms most useful to disseminate and use AlpInfoNet information. Of course this implies a "natural" selection of customers:
   a. commuters, tourists and, in general, people who have familiarity with mobile and internet applications;
   b. tourism associations, hotels, etc., that have a web site;
   c. public and private transport operators making their data available in internet (timetable, routes, etc.).
4. Customers' relationships: this step is useful to understand how each customer interfaces with AlpInfoNet tools. For the people who want to travel using AlpInfoNet information, a simple web consultation of the application will suffice: with simple steps (some "clicks" and data entered) they find the desired directions to get the destination using public/collective transport. Under the point of view of hotels, POIs, transport operators, etc., the relationship with AlpInfoNet is related to how they could be traced and located by AlpInfoNet tools. For this kind of customers it is important to have an automatic interface with AlpInfoNet tools, but also an AlpInfoNet person/reference who could solve problems related to tools/services' functionalities.
5. Revenue streams: this is one of the most delicate aspects related to a would-be profit from AlpInfoNet tools/services. A first market analysis carried out in the survey shows a very low willingness to pay by each actor involved in the process. This kind of tools/services is perceived by customers as a free application; the reason could be the comparison with other similar free applications. For example in Apple store 28% of all apps are free, nearly 50% of iPhone paid apps are priced below 1 USD, over 75% are priced below 3 USD and 99% cost

less than 50 USD (Kimbler, 2010). To make the AlpInfoNet tools profitable an increase in their "value added" for the customers deems necessary.

6. Key resources: this is the most important aspect related to the cost of upkeeping the AlpInfoNet tools/services. Depending on the extension of the area covered by the tools/services, the "infrastructure" has to be scalable and with the capacity to adapt itself to the increasing usage requests (Muhtaroglu et al., 2013).
7. Key activities: these represent the second most important aspect because several activities are needed to keep the tools ready, updated and efficient.
8. Key partners: the list of direct partners shows the heterogeneity of the actors involved in the process. As explained before, a lot of them declare a low willingness to pay, suggesting to look for resources in parallel segments of the market, probably not directly related to the AlpInfoNet services, but rather, i.e. to the re-use of data collected by the tools or to the capacity to forward different kinds of information (for example advertisements) to AlpInfoNet customers. Furthermore, the selection of the partners is also important to define cooperative agreements in order to carry out activities related to value proposition, data sharing and so on.
9. Cost structure: it is related to the key resources and the key activities of the process. In general, the costs are not constant but they boost up as the application is increasingly used.

Before addressing solutions about the perennial business model it is important to cross-check them with the outcomes of the second survey, presented in the next section.

4.2 The results of the survey to the regional administration

The second survey (see table 1) collected, the information to fill in the canvas, from the project partners, thus allowing the definition of possible business models. The outcomes of the survey, split by region, are presented in table 4. They show how customized solutions have been preferred for the perennial business model of the services provided by the project. However, a common standpoint is found in what regards the limited costs for developing and maintaining the application. This is due to the previous existence of a provider in charge of the management of other information services, regulated by specific agreements with the local/regional administration, making the marginal cost related to the above tools/services very limited. In most of the cases, the AlpInfoNet information system will be hosted on their servers and only the maintenance of the services will be paid for. Furthermore, in some cases, the services will be managed by specific (public) tourism associations that can maintain the service thanks to the income coming from their members. This situation is common to projects related to ICT where the public administrations are involved to develop and integrate existing information systems. In such a case the business model is simple and the limited financial resources needed for offering the service come from the public sector.

5. Discussion and conclusions

Lesson learned from AlpInfoNet project show some key points, worth of attention, there included data availability and the willingness to share and integrate different solutions among countries.

Good results come from the collaboration of countries, notably when neighbouring regions and private actors are part of the process. This is the case of the French-Italian or Italian-Slovenian regions; however, even if there is an agreement to share information, some difficulties to define a single and easy "place" where all the information could be stored, managed, etc., are evident. Such obstacles suggest finding out a third party that could guarantee the transparency and impartial use of the information.

In terms of tools/services maintenance, besides the solutions presented in the previous section, other proposals could be suitable and integrated in those already defined in each pilot region; the willingness to pay for maintaining the above tools/services depend on how much they are perceived as useful (under a functional and economical point of view).

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Table 4 Proposed business models for the five pilot regions

Pilot region		Business model
Piemonte region Italy	Management	The AlpInfoNet Italian IT services will be integrated in existing systems of Piemonte region and hosted by Piemonte Servers. The French services will be hosted by the French Servers.
	Costs	The assistance cost will be covered by already existing services managed by CSI (Consortium for Regional Information Systems) for Regione Piemonte. The application is provided free of charge to users and it will managed like a public service.
Provence Alpes Côte d'Azur-Rhône Alpes France	Management	The providers for the selected services are responsible for the support, the technical assistance and the training. These were an important part of the Terms of references of the tender.
	Costs	The cost for hosting the services is estimated between 2,000 and 10,000 €/year. Within the timeframe of the project, the services will be provided free of charge to third parties and to end-users. However third parties reusing the services of the AlpInfoNet application might provide marketable services. There are several opportunities for the long-term financing of these products: 1. they could be integrated in the frame of an existing Mobility Information Systems (PACA Mobilité, etc.) for its operation, management and financing; 2. they could be integrated in the frame of an existing TIS (Sitra) for its operation, management and financing; 3. they are maintained as a separate platform and a business model has to be defined. There are several possibilities for its financing: a. entirely publicly funded, by one or several public authorities; b. partly or totally privately financed: a business model is developed so that third parties (public or private) accessing the application services are required to pay a fee (subscription, fix or variable fee, etc.); c. privately financed: the business model could also be based on the advertising; d. collaborative financing: the platform and its services are maintained and operated by a community of contributors and are financed by donations.
Lake Costance Germany	Management	The German Lake Constance tourism association (DBT Deutsche Bodenseetourismus GmbH) has volunteered to host and maintain the data for local mobility offers. The management cost will be very limited. A rough estimation of maintenance calls for 4-8 hours to update the dataset. An update is recommended one or two times per year.
	Costs	The services will be provided for free. The dataset of local mobility offers is compiled and structured within the AlpInfoNet project. The maintenance and updating will be financed by the tourism association.
Lake Costance Austria	Management	In Austria, transport companies (bus and train) are required to publish timetables and also to make them available to the transport associations for publicity purposes. These political guidelines in transport and tourism in the State of Vorarlberg ensure that the improvement of information by connecting tourism and mobility data through the key players Vorarlberg Tourismus (VT) and Verkehrsverbund Vorarlberg (VVV) is also financially secured. Thus, the model in Vorarlberg assumes the connection of already existing systems by respective interfaces, which implies an ideal utilisation of existing infrastructure and resources. Verkehrsverbund Vorarlberg (VVV) and Vorarlberg Tourismus (VT) will be in charge of the support and maintenance of the interfaces.
	Costs	Upholding costs will be very low. The updating of data will occur while the system is in operation. The services will be given for free like a public service. The services are financed in the same way as the existing system via Verkehrsverbund Vorarlberg and Vorarlberg Tourismus for the purpose of public service.
Lake Chiemsee Germany	Management	LKZ Prien GmbH, in cooperation with Ifp consulting, are responsible for the management and the upgrade of the services.
	Costs	Upholding costs will be low. An update is recommended once or twice per year. The services will be given for free, like a public service.
Province of Gorizia and Goriška Italy, Slovenia	Management	A service provider (external company in agreement with Slovenian region and Municipality of Gorizia; contract needed to be signed) will host the application, while back up files will be located in both Slovenian region and Municipality of Gorizia archives. Technical assistance is included in service providing and hosting infrastructure costs. End user assistance is not yet clear (it can be provided by Slovenian region or Municipality of Gorizia or other regional tourist organisation).
	Costs	The system should be available for free for at least the first two years. Some estimated costs are: • 5,000 €/region/year for service providing and hosting infrastructure; • 3,000 €/year for data maintenance. (for Goriška region 5,000 €, for Province of Gorizia 5,000 €, 3,000 € for data maintenance - work will be made by Slovenian region and Municipality of Gorizia). The application will be given for free. Upholding costs should be borne by the municipalities public transport budget but financing should involve also transport and tourism operators (e.g. trade unions and consortia, regional tourist organisation).

Providing data and web services through smart interfaces may interest tourism players if they are conceived as an integrated package of tourism and transport data. For example, SITRA, a major tourism player in the French pilot region, has identified this opportunity and thinks that there is an effective demand for such added-value services if they are provided as a coherent combination of transport and tourism information services.

For this reason, the definition of the business model could become dynamic. The tool attraction will grow in time depending on the level of its development and on the offered services, as well as on the services that could be developed according to the use of the applications by the end-users. For example, the analysis of the data coming through AlpInfoNet tools/services could provide accurate information about the travel behaviour and the habits of the travellers, useful to the tourism operators to better attract them as potential customers.

An interesting perspective in classifying the business models is that of users (as defined in Fig. 2), considering how they could perceive the tools/services and its value and, consequently, if and how they would pay for benefitting of the offered services. The classification of the potential business models showed in table 5 can be successfully transferred to other regions, adding a further point of attention: who will manage and/or own the tools/services regardless of who will use them. Thus, thinking how to uphold the developed tools/services, the possible (exportable) solutions are:

- getting income from advertising showed on AlpInfoNet widget;
- getting income from actors involved in the process;
- getting income as commissioners of transactions (ticket and booking) made through AlpInfoNet application;
- receiving income selling the data of AlpInfoNet users' (useful for market analysis for Ho.Re.Ca, Hotellerie-Restaurant-Café, and transport operators).

It is clear that in the new economy related to tourism, the competitiveness of the destinations and places will not only be correlated to the presence and attraction capacity of point of interests but also to the ability to connect them in the ICT network with the new technologies (Katsoni, 2011).

Table 5 Business models classified by users of the tools/services

Users	Business model	
Travellers (tourists and commuters)	Free use of the app downloaded on personal smartphones	Only the cost for the first download to buy the app (very few Euros, for example 1-2€). The price could be defined by a market analysis on similar applications (for example on Google Play, I-tunes, Android Market). If the user allows to give her/his personal details (s)he can use and download the app for free. Exclusive promotional offers are sent to her/him.
Public administrations	Sponsoring the application by covering part of the maintenance	Managing the application directly in house with their own resources (staff providers, etc.), or making synergy with existing information systems.
Private and public transport operators	Free use of the application if they provide their updated timetable and stop points to the AlpInfoNet database	Free of charge to be included in the AlpInfoNet database, but paying twice a year for using data coming from users' profile collected by AlpInfoNet tools/services. How much paying, in which way and when (annual, biannual, etc.) has to be defined. An example is Orange Fluxvision, a product providing "marketing services" based on mobile phone data analysis.
Tourism operators: local providers (hotels, camping, restaurants, etc.)	Free use of the application if AlpInfoNet tools are included in their online sales or booking platforms	Free of charge to have their POIs included in the AlpInfoNet database, but paying monthly to use data coming from users' profile collected by AlpInfoNet tools/services. How much paying, in which way and when (annual, biannual, etc.) has to be defined. Example of big competitors, such as Google or Orange (Fluxvision), can be analysed to find relevant references.
Tourism operators (not local providers)	Free use of the AlpInfoNet applications	A charging policy could be applied for accessing to historical data on travel behaviour of tourists, based on the analysis of the database collected thanks to the tools.

State-of-the-art literature shows that there is not a real and clear guide or a best-practice for developing perennial business models for applications or services developed within projects like AlpInfoNet. However, the canvas

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presented in table 3 is a good starting point to design the flow chart for defining the organisation of AlpInfoNet services.

The outcomes of the research show that some partners have defined some solutions on how to keep their application alive at the closedown of the project. In most of the cases some agreements have already been made between the public body and their ITS providers to operate and maintain the AlpInfoNet tools/services after the end of the project, as a stand-alone solution or coupled with other existing systems.

Presently, all the pilot regions have decided to give the application for free and they argue that the public investment is the fairer option where the main actors involved are the transport operators and the tourism associations. However, the approach for the business model must be considered as a dynamic process because its logic must be tested, adjusted and tuned when the applications progressively meet the market and the market structure is understood.

Yang and Huang (2004) developed an analytical model to support the idea that an optimal growth for the diffusion of ATISs should have a pricing strategy that is time-dependent: the launch needs to be free to diffuse the application; a support from public sectors and advertising is needed at the onset. When the consumers will be satisfied, a yearly update may be charged, at a justified price, in order to maintain the economic feasibility.

New value propositions may be needed to offer what the consumers really consider valuable and might be willing to pay for: for example additional service-related data, tourist information for popular destinations, suggestions of sightseeing or online hotel booking. Defining a set of supplementary activities related to the main service makes access to the market easier, and – thanks to the possibilities offered by the Information Technologies – the outreach to very specific market segments.

For example, regarding the mobile applications dealing with route planners, Shilit et al. (2002) individuated the most important aspects: 'where you are', 'who you are with' and 'what resources are nearby'. An application being able to evaluate the current location of the user, her/his companions as well as the availability of resources in her/his surrounding can increase considerably the perceived usefulness of a mobile application. Similar services are offered by an increasing number of applications, e.g. the new app 3cixty (https://www.3cixty.com/). Thus, an aspect to be developed in the AlpInfoNet tools/services will be the possibility to analyse the context surrounding the user location.

The deployment of open-sources and crowd-developed trip planners may reduce the costs and widen the potential competition for the market (Hillsman and Barbeau, 2011). Based on OpenStreetMap and using GTFS (General Transit Feed Specification) data, OpenTripPlanner[††] allows any developer to create and maintain a web-based multi-modal trip planner.

Tourism market structure has recently evolved and this trend will continue in the future. As the interaction with the technology creates new timelines in marketing, planning and advertising, it is of utmost importance to attract travellers who would make a greater use of internet to buy online products and services at any time and in any place.

According to the European Travel Commission (ETC)[‡‡], in the developed countries, internet is the first information provider when searching travel destinations. Other information services, as mobile apps, have been developed without apparently achieving economic feasibility.

There is a common difficulty to generate revenues out of any mobile service and any innovative business model is designed by trial and error until – perhaps – it becomes perennial. Charging the commercial actors for using the services, or trading it in return for advertisement space, may be a barrier to the diffusion of such services amongst professionals. After a period devoted to gather the data and carrying out statistical and market analysis, specific services could be sold to the transport providers. However, this might bear some extra costs. A financial study has to be made in order to understand the sensitivity of the costs in regard to the volume of services or to additional

[††] http://www.opentripplanner.org/ (Accessed on July 2014)

[‡‡] http://www.etc-digital.org/digital-trends/consumer-behaviour/consumer-trends/ (Accessed on July 2014)

services provided. A mix of revenue stream will be necessary and, at the end, if the customers perceive the services add a real value to their travel experience, they will be ready to accept a charge for them.

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